SOUTHERN CALIFORNIA
EDISON
An EDISON INTERNATIONAL Company

A. Edward Scherer
Manager of
Nuclear Regulatory Affairs

January 3, 2005

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

Subject: **Docket Nos. 50-361 and 50-362**
Relaxation Request 3 for Reactor Pressure Vessel Head Penetration Inspection Requirements for San Onofre Nuclear Generating Station (SONGS) Units 2 and 3

Dear Sir or Madam,

This letter transmits Southern California Edison (SCE) Relaxation Request 3 (Enclosed) from the requirements of the First Revised NRC Order (EA-03-009) Establishing Interim Inspection Requirements for Reactor Vessel Heads at Pressurized Water Reactors, Issued on February 20, 2004.

Relaxation Request 2 was approved by the NRC for one cycle of operation by letter dated March 19, 2004. Approval of Relaxation Request 2 specified conditions that require SCE to review and if necessary revise or rescind the relaxation request should certain technical inputs be determined to be inadequate based on future research. This condition has been incorporated by SCE into Relaxation Request 3. Physical interferences prevent full compliance with the First Revised Order and the basis for Relaxation Request 3 is technically identical to the previously approved Relaxation Request 2.

Therefore, SCE is requesting approval of Relaxation Request 3 until it is either withdrawn or rescinded.

A101

P.O. Box 128
San Clemente, CA 92674-0128
949-368-7501
Fax 949-368-7575

SCE requests NRC approval by June 30, 2005 to support the preparation and planning for the next Unit 2 refueling outage, which is currently scheduled to begin in late November, 2005. Should you have any questions, please contact Mr. Jack Rainsberry at (949) 368-7420.

Sincerely,

Enclosure

cc: B. S. Mallett, Regional Administrator, NRC Region IV
B. M. Pham, NRC Project Manager, San Onofre Units 2 and 3
C. C. Osterholtz, NRC Senior Resident Inspector, San Onofre Units 2 and 3

Enclosure

First Revised ORDER EA-03-009
Relaxation Request 3

Request For Relaxation From The Requirements Of The First Revised NRC Order EA-03-009 Issued February 20, 2004 To Address Inaccessible Areas Respective To Non-Destructive Examinations

Enclosure

First Revised NRC ORDER (EA-03-009) Relaxation Request 3

1. Components Affected

SONGS Unit 2: Ninety-one (91) Control Element Drive Mechanism (CEDM) penetrations

SONGS Unit 3: Ninety-one (91) Control Element Drive Mechanism (CEDM) penetrations

2. NRC Order Requirement

The First Revised NRC Order (EA-03-009), Establishing Interim Inspection Requirements for Reactor Pressure Vessel Heads at Pressurized Water Reactors (Reference 1) established interim inspection requirements for reactor pressure head penetrations.

Part IV.C(5)(b)(i) of Revised EA-03-009 requires Ultrasonic testing of the reactor pressure vessel (RPV) head penetration nozzle volume (i.e., nozzle base material) from 2 inches above the highest point of the root of the J-groove weld (on a horizontal plane perpendicular to the nozzle axis) to 2 inches below the lowest point at the toe of the J-groove weld on a horizontal plane perpendicular to the nozzle axis (or the bottom of the nozzle if less than 2 inches [see Figure IV-1]); OR from 2 inches above the highest point of the root of the J-groove weld (on a horizontal plane perpendicular to the nozzle axis) to 1.0-inch below the lowest point at the toe of the J-groove weld (on a horizontal plane perpendicular to the nozzle axis) and including all RPV head penetration nozzle surfaces below the J-groove weld that have an operating stress level (including all residual and normal operation stresses) of 20 ksi tension and greater (see Figure IV-2). In addition, an assessment shall be made to determine if leakage has occurred into the annulus between the RPV head penetration nozzle and the RPV head low-alloy steel.

Part IV.C(5)(b)(ii) of Revised EA-03-009 requires an Eddy current testing or dye penetrant testing of the entire wetted surface of the J-groove weld and the wetted surface of the RPV head penetration nozzle base material from at least 2 inches above the highest point of the root of the J-groove weld (on a horizontal plane perpendicular to the nozzle axis) to 2 inches below the lowest point at the toe of the J-groove weld on a horizontal plane perpendicular to the nozzle axis (or the bottom of the nozzle if less than 2 inches [see Figure IV-3]); OR from 2 inches above the highest point of the root of the J-groove weld (on a horizontal plane perpendicular to the nozzle axis) to 1.0-inch below the lowest point at the toe of the J-groove weld (on a horizontal plane perpendicular to the nozzle axis) and including all RPV head penetration nozzle surfaces below the J-groove weld that

have an operating stress level (including all residual and normal operation stresses) of 20 ksi tension and greater (see Figure IV-4).

3. Proposed Alternative

SCE seeks relaxation from the First Revised NRC Order EA-03-009 where inspection coverage is limited by inaccessible areas of CEDM penetration nozzles with respect to nondestructive examination (NDE), including ultrasonic testing (UT), eddy current testing (ET), and dye penetrant testing (PT).

SCE proposes to either meet the Order requirements or to examine each CEDM nozzle from 2 inches above the top of the attachment weld to as far down the nozzle as physically possible. This distance shall be at least the minimum inspection distance below the bottom of the attachment weld as follows:

CEDM # 1	.44 inches below the bottom of the weld
CEDM #'s 2 through 35	.43 inches below the bottom of the weld
CEDM #'s 36 through 87	.42 inches below the bottom of the weld
CEDM #'s 88 through 91	.35 inches below the bottom of the weld

4. Reason for Relaxation Request

The requirements of the First Revised Order (EA-03-009) cannot be met for each CEDM nozzle due to the presence of a CEDM extension shaft guide cone threaded to the ID surface.

A drawing showing detailed dimensions of a CEDM penetration (SO23-901-213, Rev. 1) was provided as Attachment 1 to the December 9, 2003 letter (Reference 3). In the discussions regarding distances below the J-groove weld, the J-groove weld is assumed to include the associated fillet weld. A letter dated February 9, 2004 (Reference 4), provided additional information regarding the CEDM extension shaft guide cone threads in support of this relaxation request.

5. Basis for Relaxation

The phenomenon of concern is primary water stress corrosion cracking (PWSCC), which typically initiates in the areas of highest stress. The area of CEDM penetrations that has the highest residual stress is the area adjacent to

the J-groove attachment weld. Therefore, it is most probable that PWSCC will initiate adjacent to the J-groove attachment weld. PWSCC at or above the attachment weld resulting in pressure boundary leakage and the potential development of a safety concern (ejection of a nozzle or substantial corrosion of the low-alloy steel RPVH) prompted the NRC to issue Order EA-03-009. The inspections at San Onofre Nuclear Generating Station (SONGS) will ensure the integrity of the pressure boundary.

In previous NRC reviews of relaxation requests for un-inspectable areas of RPV head penetrations, the NRC has requested that an analysis be performed to characterize the potential growth of postulated cracks in the un-inspected areas. This type of analysis has been performed for SONGS Units 2 and 3. Results from the SONGS specific structural integrity evaluation of RPV head penetrations were provided in the February 9, 2004, submittal (Reference 4). This submittal included Westinghouse Report WCAP-15819, Rev. 1, "Structural Integrity Evaluation of Reactor Vessel Upper Head Penetrations to Support Continued Operation: San Onofre Units 2 and 3" (Reference 2).

The minimum inspection distance below the weld that was approved (see Section 7 for Precedent) and is proposed for each CEDM nozzle is based on the Appendix C curves provided in WCAP-15819, Rev. 1.

The postulated initial crack for the WCAP-15819, Rev. 1, Appendix C curves extends from the expected lower extent of the inspection coverage area to the point where hoop stresses on either the ID or the OD become compressive. Appendix C crack growth curves use design weld sizes, which are conservative compared to the as-built weld sizes.

The minimum inspection coverage values that are requested are taken from the most conservative crack growth rate curves. These Appendix C curves support that a through-wall axial crack growing from minimum distance inspected for each CEDM below the weld would take at least one operating cycle to reach the bottom of the weld.

This does not include the time that would be required for an axial crack to propagate through the attachment weld and result in a leakage path. Additional operating time would be required for a safety concern (ejection of a nozzle or substantial corrosion of the low-alloy steel RPV head) to develop as a result of that leak. Therefore, multiple inspection intervals would be available to detect a flaw that initiates in the un-inspected region prior to potential development of a safety concern.

The threaded portion of the extension shaft guide cone would serve to retain potential loose parts resulting from a circumferential crack in the un-inspected area. A postulated 360-degree through wall crack in the narrow un-inspected annulus above the guide cone threads could result in separation of the guide cone from the penetration. However, in that case, the guide cone would be retained by the control element assembly (CEA) shroud and associated CEA extension shaft. This condition would not interfere with CEA function or any other reactor coolant system function, and would be readily observed in the subsequent refueling outage.

Based on a review of data acquired during the Unit 2 and 3, Cycle 13 refueling outages, examination data can be collected from 2 inches above the top of the attachment weld to at least the requested minimum distances below the bottom of the attachment weld in all 91 CEDM penetrations. The proposed inspection scope to at least the minimum distance below the attachment weld provides at least one additional inspection interval to detect cracks propagating from the un-inspected area to the bottom of the weld and multiple inspection intervals would be available to detect cracks propagating from the un-inspected area before they could develop into a safety concern.

6. Duration of Proposed Alternative

The proposed alternative will apply until rescinded by the NRC or withdrawn by SCE.

If the NRC staff finds that the crack-growth formula in industry report MRP-55 is unacceptable, then SCE will revise its analysis that justifies relaxation of the Order within 30 days after the NRC informs the licensee of an NRC-approved crack growth formula. If SCE's revised analysis shows that the crack growth acceptance criteria are exceeded prior to the end of the current operating cycle, SCE will consider Relaxation Request 3 to be rescinded, and within 72 hours, SCE will submit to the NRC written justification for continued operation. If the revised analysis shows that the crack growth acceptance criteria are exceeded during the subsequent operating cycle, SCE will, within 30 days, submit the revised analysis for the NRC review. If the revised analysis shows that the crack growth acceptance criteria are not exceeded during either the current operating cycle or the subsequent operating cycle, SCE will, within 30 days, submit a letter to the NRC confirming that its analysis has been revised. Any future crack-growth analyses performed for this and future cycles for RPV head penetrations will be based on a crack growth rate formula that is acceptable to the NRC.

7. Precedent:

Letter from H. N. Berkow (NRC) to H. B. Ray (SCE) dated March 19, 2004; Subject: Relaxation of the Requirements of Order EA-03-009 Regarding Reactor Pressure Vessel Head Inspections, San Onofre Nuclear Generating Station (SONGS), Units 2 and 3 (TAC Nos. MC1542 and MC1543)

8. References:

1. First Revised NRC Order (EA-03-009) Establishing Interim Inspection Requirements for Reactor Pressure Vessel Heads at Pressurized Water Reactors, issued on February 20, 2004

2. Westinghouse Report WCAP-15819-P, Rev. 1, "Structural Integrity Evaluation of Reactor Vessel Upper Head Penetrations to Support Continued Operation: San Onofre Units 2 and 3"

3. Letter from A. E. Scherer (SCE) to the Document Control Desk (NRC) Dated December 9, 2003; Subject: Docket Nos. 50-361 and 50-362, Request For Relaxation Of Reactor Pressure Vessel Head Penetration Inspection Requirements In Nuclear Regulatory Commission Order EA-03-009, San Onofre Nuclear Generating Station Units 2 and 3

4. Letter from A. E. Scherer (SCE) to the Document Control Desk (NRC) Dated February 9, 2004; Subject: Response to NRC Request for Additional Information Regarding Relaxation Requests 1 and 2 for Reactor Pressure Vessel Head Penetration Inspection Requirements in Nuclear Regulatory Commission Order EA-03-009 for San Onofre Nuclear Generating Station (SONGS) Units 2 and 3 (TAC Nos. MC1540, MC1541, MC1542, and MC1543)